Large Capacity Field Heater (LCFH)

The LCFH, the largest of the new family of Improved Army Space Heaters (IASHs), replaces the existing MIL-STD 400,000 BTUH Gasoline powered and operated field heater (MS 400). The LCFH offers increased performance capabilities and improved safety features.

Capabilities/Attributes:
- Self-powered, 400kBTUH Heating Capacity
- Multi-fueled - JP-8, DF1, DF2, and DFA
- Low Temperature Operation (-60F)
- Size - 62"L x 44"W x 40"H
- Weight – 622 lbs

Reduced Logistics Burden:
- High Efficiency Burner
- Increased Reliability
- Self-diagnostics

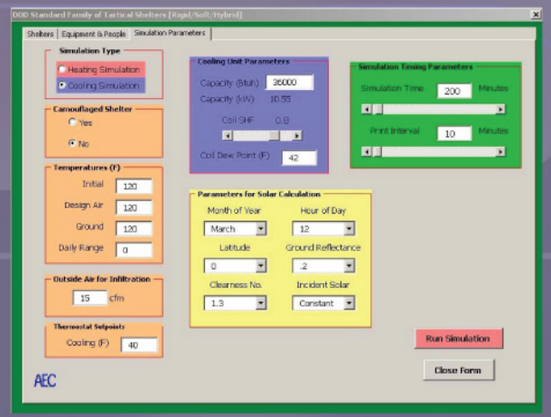
Safety Features:
- Flame Failure
- High Temperature Air Out
- Carbon Monoxide Level Detection

Environmental Assessments

Shelter Assessment Model

An Environmental Assessment Model was developed to assist system designers in determining the heating and cooling loads of the system in order to choose the optimal size of Environmental Control Unit. The model allows both transient and steady-state assessments of shelters and tents in heating and cooling scenarios.

Capabilities/Attributes:
- Integrated Solar Model
- Models Psychometric and Internal Heat Load from Occupants and Equipment
- Shelter, Equipment, and ECU Database
- Shelter Ground Coupling
- Lumped Capacitance Modeling for Transient Response of Indoor and Shelter Wall Mass



Test & Evaluation Facilities

ECU Component Test Lab
- Compressors
- Heat Exchangers
- Work Recovery Devices
- Expansion Devices

Dual Room Environmental Performance Chamber
- Capability - 66kBTUH
- Independent Temperature Controls - 65°F to 130°F
- Humidity Control on Indoor Room

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"Technology to the Warfighter Quicker"

Environmental Systems Branch

Army Power Division

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FORT BELVOIR, VIRGINIA

Mission Statement:
To lead the Army in the Research and Development of Environmental Control Systems

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US ARMY – RDECOM

Environmental Systems Branch

Transitioning Leading Edge Cooling/Heating Technology to the Warfighter

Technology Thrusts:
- Non-ozone depleting refrigerants (R-134A, R-410A)
- Non-ozone depleting/zero net global warming refrigerant (CO2)
- Co-Generation Power and Cooling

Competencies/Tours de Force:
- Applied Research
- Advanced Technology Development
- Technology Demonstrators
- Environmental Assessments
- Prototype Fabrication
- Testing and Evaluation
- Acquisition Planning and Execution
- Source Selection Support
- Field Support

Customers include:
- PEO-CS & CSS/PM-FSS/PM-TV
- PEO-C3T/PM-MEP/PM-TOC
- PM-WMD

Recipient of the FY05 Secretary of the Army Environmental Award for Environmental Excellence in Weapon System Acquisition based on the development of the CO2 Cooling System for the Up-Armored HMMWV

State-of-the Art, Off-the-Shelf Technologies

Improved Environmental Control Units (IECU)

Present and emerging C4ISR systems require environmental control to moderate the environmental temperatures in which these systems operate. The IECU is a new family of ECUs designed to meet this need utilizing state-of-the-art cooling technologies to eliminate ozone depleting chemicals and lower logistics costs and reduce logistics footprint.

Capabilities/Attributes:
- 9kBTUH to 120kBTUH Cooling
- Clean Air Act of 1990 compliant
- Non-ozone depleting refrigerant
- Reduced power consumption
- Reduced weight
- Reduced noise

Advanced Future Technologies

Natural Refrigerant (CO_2) Cooling Systems

Transcritical CO2 cooling technology offers improvements over current fluorocarbon refrigerants for mobile military applications. Current and future armored tactical vehicles, such as the M1114 Up-Armored HMMWV and Future Tactical Truck System - Utility Variant, are being equipped with advanced CO2 systems for demonstration and testing. Also, unitary environmental control units (ECUs) in sizes from 9kBTUH to 60kBTUH for shelters and tent applications are being developed and tested.

Better Performance:
- Reduced Weight & Volume
- Improved High Temperature Operation
- Reduced outlet temperatures/Rapid Pull-down
- Instant Heat Capability

Reduced Logistics Burden:
- No Refrigerant Recovery/Recycling
- No Technician Certification
- Reduced O&M Costs

Environmentally Friendly & Safe:
- Non-ozone Depleting
- Zero net Global Warming
- Non-flammable/toxic

M114 Up-Armored HMMWV

Future Tactical Truck System Utility Variant

18kBTUH Unitary ECU

Cogeneration Power and Cooling

Heat driven cooling, utilizing waste heat from a power source such as a fuel cell or stirling power source, has the potential for substantial improvements in overall system efficiency, resulting in reduced fuel consumption. New advancements in micro-manufacturing is making cogeneration feasible for mobile military applications.

Capabilities/Attributes:
- >50% Reduction in fuel consumption
- Reduced system weight
- Waste heat driven cooling system
- Microtechnology based components

Micro-channel Components

Conventional Power & Cooling
- System Efficiency = 25%

Cogeneration Power & Cooling
- System Efficiency = 60-70%